DEFORMITY FROM FRACTURES AT THE LOWER END OF THE HUMERUS, AND HOW IT MAY BE AVOIDED.

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DEFORMITY FROM FRACTURES AT THE LOWER END OF THE HUMERUS, AND HOW IT MAY BE AVOIDED.*

I HAVE taken as my subject deformity following fractures at the lower end of the humerus, and I hope to be able to demonstrate that a deformity is favored or produced by the splints usually recommended in the treatment of these injuries; that the deformity will be the same whether the fracture involves the inner or outer condyle or the lower epiphysis of the humerus, and that a similar deformity is likely to follow, even when no splints are used and the limb consigned to a cushion or merely suspended in a sling. The deformity I allude to is one that has long been familiar to surgery and well represented in Figs. 1 and 2.

This deformity exhibits an angularity, the reverse of that seen in the normal arm. In the normal limb, the bones of the forearm make, when extended upon the humerus, an obtuse angle, which will be readily seen by looking length-

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wise at Fig. 3.   This is always present even in muscular and fleshy arms, but is especially noticeable in the emaciated and in the skeleton.   Hence a normal arm is not a straight arm.   The angle of junction of the arm and forearm is on the radial side of the limb, and the reason of this angularity is found in the well-known anatomi-

FIG. 1.—DEFORMITY AFTER FRACTURE AT THE LOWER END OF THE HUMERUS.
From a Photograph.

cal fact, that the inner or trochlear portion of the end of the humerus is lower than the capitellum or radial portion,

FIG. 2.—DEFORMITY AFTER FRACTURE AT THE LOWER END OF THE HUMERUS.
From Gross' System of Surgery.

and when the axis of the articular end of the humerus is examined in relation to the axis of the shaft of the humerus (see both arrows), the angle of their axes is readily seen.

Now in the deformity under discussion, the obtuse angle is upon the ulnar side of the limb (Figs. 1 and 2), and I shall endeavor to show that this is favored, if not directly produced, by the usual mode of treatment.

The first splint that I shall examine is the well-known Physick's elbow splint. It consists of two thin strips of wood, joined at a right angle as represented in Fig. 4.

It is applied to the limb when bent at a right angle and secured to it by a bandage extending from the hand to near the shoulder. At a superficial glance the splint seems to be a most happy contrivance, since it is inexpensive, light, may be applied with ease, readily removed, and when in position affords a safe, secure, and comfortable dressing. But let us look more closely at its adaption to the *bones* of the part; for it is the mal-position of the bones

FIG. 3.—NORMAL ANGLE OF BONES OF THE FOREARM WITH HUMERUS.

during repair that produces permanent deformity. If we glance at the bones of the forearm as they join the hu-

FIG. 4.—PHYSICK'S ELBOW SPLINT.

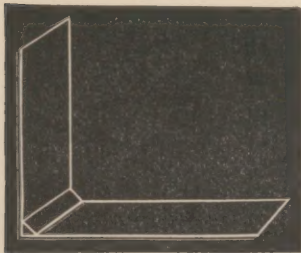merus, we will see that under no circumstances are they upon the same level; that the radius, when the arm is bent, as in Fig. 5., is more superficial—is upon a higher plane than the ulna; and that the splint (Fig. 4.), when applied, rests at the bend of the arm upon the radius, and does not and cannot touch the ulna. In other words, the splint does not rest equally upon the radius and ulna at the bend of the arm.

Now the effect of this may be better understood by a

figure representing a front view of the humerus—Fig. 6.
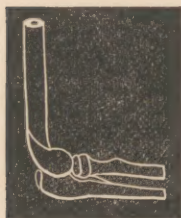Let the radius (*R*) and ulna (*U*) appear as when the fore-

FIG. 5.—THE DIF-
FERING PLANES OF
THE RADIUS AND
ULNA.

arm is bent at a right angle with the
humerus. Now in the application of the
splint, it (the splint) will be seen to rest
on a level with the top of the radius (see
line *A*), and when the bandage is applied,
passing as it does under the forearm, it
(the bandage) will be seen to exert its in-
fluence wholly upon the ulna (see line *B*).
Let us suppose the fracture to involve
the internal con-
dyle, and that the internal condyle
attached as it is to the ulna, is the
movable, non-resisting part of the
joint. Now what would be the
most natural consequence from the
pressure upward upon the ulna from
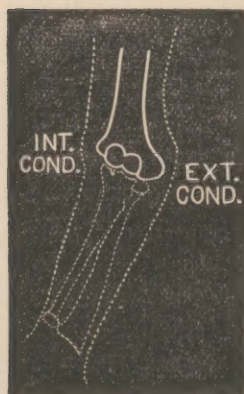the bandage, and the resistance or
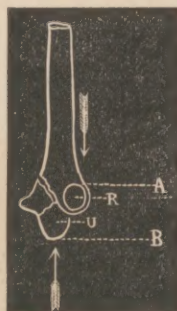counter-pres-
sure from the
splint? Will
it not be to
carry the

FIG. 6.—RELATIONS OF
ARTICULATING PORTIONS OF
RADIUS AND ULNA TO LOW-
ER END OF HUMERUS, IN
FRACTURE OF THE INTER-
NAL CONDYLE.

FIG. 7.—ALTERED SHAPE
OF THE LOWER END OF THE
HUMERUS AFTER FRACTURE
OF THE INTERNAL CONDYLE.

The whole deformity is pro-
duced by the elevation of the
condyle. See Gurlt, *Knochen-
brücke*, vol. i, p. 317.

non-resisting ulna up toward the
fixed resisting splint, and thus ele-
vate the internal condyle, as re-
markably well shown in Fig. 7? But
there is a second point of great
importance in the mechanism of
this deformity, viz., that the pres-
sure and counter-pressure are not
opposite each other. Look again at
the figure (6) and it will be seen that

the upward pressure from the bandage (lower arrow) is near the middle of the joint, while the downward pressure, *i.e.*, *resistance*, is at the outer border of the joint, and depends upon the fact that the external lateral ligament is still secure. Hence the upward pressure will not only tend to elevate the internal condyle, but to give the olecranon a peculiar twist toward the now displaced inner condyle. Thus are brought about the most constant deformities in injuries to the internal condyle of the elbow-joint, viz., elevation of the condyle and an inward twist of the olecranon.

Let me now change the dressing and apply the posterior angular splint, an instrument represented in Fig. 8, and too familiarly known to require description. By this arrange-

FIG. 8.—POSTERIOR ANGU-LAR SPLINT.

ment the ulnar surface of the forearm rests in the splint, and the bandage is applied to its upper or radial surface. Now the same principle holds good here as in the previous splint. Between the bandage and splint there is pressure. But the bandage is now applied over the radius, fixed, because attached to the sound part of the joint, while the splint, resting as it does upon a movable ulna—movable because attached to a broken condyle—will yield to the influence of the bandage, will rise, and thus produce the precise deformity brought about by the former splint.

A third splint is the internal angular (Fig. 9), and is a favorite instrument with some surgeons. It is very
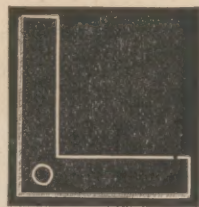

FIG. 9.—INTERNAL AN-GULAR SPLINT.

light, and since it is applied to the inner aspect of the arm and forearm, an opening is left to avoid pressure upon the epitrochlea.

FIG. 10. — RELATION OF BONES OF FOREARM TO SPLINT.

Dotted line indicates lower border of ulna, and the figure shows how little support the bones of the forearm get from the splints.

When the splint is applied it would seem to meet every indication, but if we look at the splint as a means of support to the bones of the forearm, we will see that as they approach the humerus neither of them get the least support (see dotted line, Fig. 10), and when the bandage is applied, its force must displace the movable condyle. One of the worst deformities I have ever seen (Fig. 1, page 290) was treated by an eminent surgeon on such a splint as this—the original injury being merely a simple fracture of the external condyle, Fig. 11.

Let us now take a fracture of the external condyle (Fig. 11) and apply the first splint, the anterior angular. Here we have the internal condyle fixed and the outer condyle movable. The splint rests upon the movable radius—movable because attached to a broken condyle (*A*), and the bandage is applied as before around the ulna (*B*). What now must take place? The ulna cannot rise, but the

FIG. 11. — FRAC-TURE OF THE EX-TERNAL CONDYLE.

radius can fall, and thus the axis of the articular surface of the humerus suffers the same practical change as by an elevation of the internal condyle, and the same deformity is produced.*

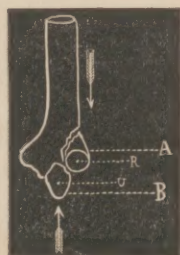Let us now apply the same principle to a fracture of the epiphysis. In this injury the articular extremity

* See pages 298–9, Figs. i–xvi–xviii–xix.

is severed from its connection with the shaft of the humerus, though its connection with the radius and ulna has not been in the least disturbed. The shaft of the humerus has no controlling influence in the mechanism of deformity from this accident, but the bones of the forearm having the full control of the epiphyseal fragment, can dispose of it as they will. Let the same splints be now applied as to Fig. 6. Here the pressure lies between the horizontal portion of the

FIG. 12. — FRAC-TURE OF THE EPIPH-YSIS.

splint and bandage as before, but now both bones, radius and ulna, are at liberty to move, and what must be the effect of pressure downward upon the prominent radius and pressure upward upon the prominent ulna? Will it not be, in effect, to change the axis of the articular surface, and to change it as it has been changed in the other injuries?

I have thus far spoken only of the effect of splints as mechanical agents favoring deformity. I wish now to mention another agency, since I stated in the outset that deformity of a similar kind might follow the non-employment of splints. It is not strange that the agency of the muscles would produce a deformity, but it is a little remarkable that
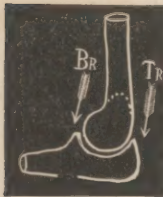

FIG. 13.—ACTION OF MUSCLES ON HEAD OF ULNA.

in this class of injuries, and especially in fractures of the internal condyle, the action of the two powerful muscles, the triceps and brachialis anticus, should, by their attachment upon the ulna (just in front and behind the fractured condyle, Fig. 13), lift the condyle and produce an effect similar to that of the splint. Such, however, must be their action, and a similar action would be likely to follow from an epiphyseal fracture; but just what deformity would follow from mus-

cular action alone when the fracture was confined to the external condyle I am not able to point out.

When a fracture at the elbow is treated without splints, as it sometimes is, the resulting deformity cannot fairly, I think, be wholly attributed to muscular action. It must never be lost sight of that the fracture has occurred at the junction of two long levers, the arm and the forearm, and the mere position of the forearm can dispose of the detached condyle as it chooses. Let any one lie on his back and place his elbow on a cushion, thus imitating the position assumed in this peculiar treatment. He will notice that the internal condyle lies on the pillow and almost perpendicularly above it is the external condyle. Hence the limb is in the position most favorable for the forearm by its weight alone to drag the external condyle down or push the inner one up. When the arm is carried in a handkerchief, if this is tied so tightly about the neck as to support the entire weight of the limb, a deformity from the combined action of *the support* and the muscles will be inevitable, if the fracture is of the internal condyle. If, however, the forearm rested lightly in the sling, then the deformity would lie between the muscles and the position assumed by the forearm.

What I have said thus far will find some support in the frequency with which this class of injuries is followed by deformity, and the peculiar resemblance these deformities have to each other. In order to make this the more striking I have collected and grouped nineteen cases (pages 298–9); four of these are from the Empire State, fifteen from the Keystone. A peculiar deformity, well described as the gun-stock, will be seen to run through them all, and this will be best seen by glancing the eye along each as upon a gun. Had each of these cases suffered from the same accident, fallen under the care of the same

surgeon, and been treated on the same splint, there would not be any wonder at so strong a resemblance; but the fact is, sixteen medical men, each unconscious of the other's mode of treatment, had the care of these nineteen cases.

Case i was treated by a surgeon eminent in his day in Philadelphia. He employed an internal angular splint. Case iii was treated by the interne of one of our hospitals, fresh from college, and though at the time not competent to treat the case intelligently, yet the result compares favorably with the first. Some of these were treated by physicians who made no pretensions to surgery and who certainly had little surgical experience. Such a case is No. x. Cases vii, xviii and xix were treated by a surgeon of rare promise, and one who has had a great deal of experience in elbow injuries. Cases iv and xiv were treated by men who had hospital experience during the late war, and both felt they knew how to treat a fracture in this vicinity. One thing I can say of all of them, viz., the rectangular position recommended by all writers was the one adopted, and while some used the anterior, others the internal lateral, and still others sole leather splints, yet all have produced deformities as much alike as if one person and one splint had been alone employed, and that too upon the same fracture.

It would be a most sweeping assertion, and one that I am not prepared to make, that the right-angled splints can never be safely used. Surgeons have told me that they have had good results from the very splints I so earnestly condemn. That this may occur and be rather due to the fortunate character of the fracture than the skillful application of a splint, I think I can make clear by a diagram (Fig. 14), exaggerated to best illustrate my idea. Let the upper part of the figure represent the humerus with its
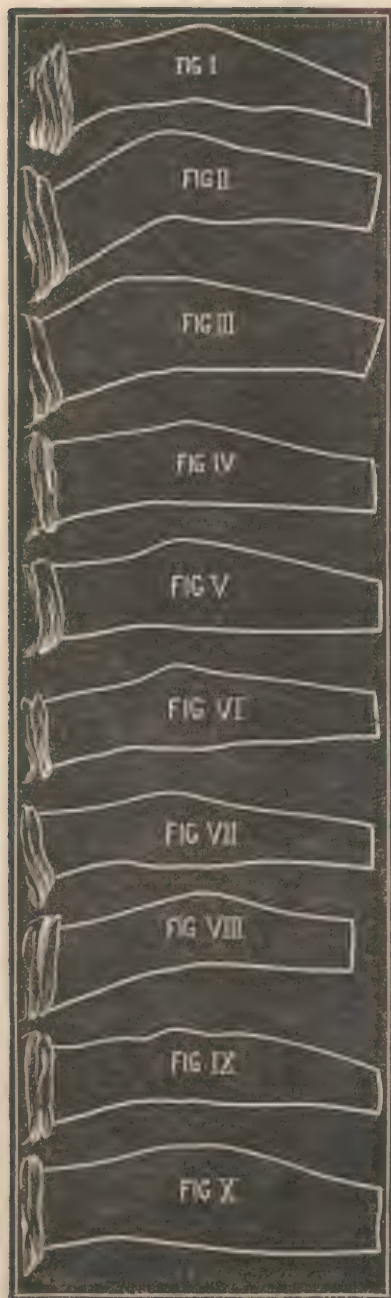
Fig. I.—W. R. Ext. condyle fractured when 14 years old. Internal angular splint. Extreme deformity. Good motion except carrying.

Fig. II.—Louis L. No history. Partial dislocation of head of radius. Int. condyle raised ¾ inch, olecranon slightly twisted, no abridgment of motion.

Fig. III.—Fracture of Int. condyle. Twist of the olecranon. Condyle elevated ½ inch. Rectangular dressing. Both flexion and extension slightly abridged.

Fig. IV.—J. H., left arm, two years ago. Ext. condyle depressed ⅓ inch. Line of fracture still very plain. Rectangular splint. Extreme flexion a little abridged. Carrying function lost.

Fig. V.—F. R. G., left arm injured in childhood. No history. Int. condyle now ⅓ inch above the line of the external. Function good except carrying.

Fig. VI.—Geo. F. Fracture occurred in early infancy. No history. Int. condyle elevated ¾ inch, olecranon twisted inward. Motion equal to sound arm.

Fig. VII.—Geo. T. Int. condyle of left arm. Treated with sole leather splints at right angles. Condyle elevated ⅓ inch. Good motion.

Fig. VIII.—J. F. Fracture Int. condyle two years ago. Rectangular splint. Motion abridged one half.

Fig. IX.—Taken from Dorsey's Surgery, Edition, 1813, vol. 1.

Fig. X.—Fracture Int. condyle when about six years old. Int. condyle elevated ¾ inch. Every function but the carrying. Rectangular dressing.

Fig. XI. — From Gross' System of Surgery.

Fig. XII.—R. L. S., 55. Fracture occurred in early life. No loss of function save the carrying.

Fig. XIII.—Wm. D., 34. Fracture Int. condyle in early life. Condyle raised ½ inch above normal level. Treated with wooden rectangular splints. Good movement.

Fig. XIV.—John F., 12. Fracture Int. condyle about four years ago. Great deformity. Good function. Angular wooden splints.
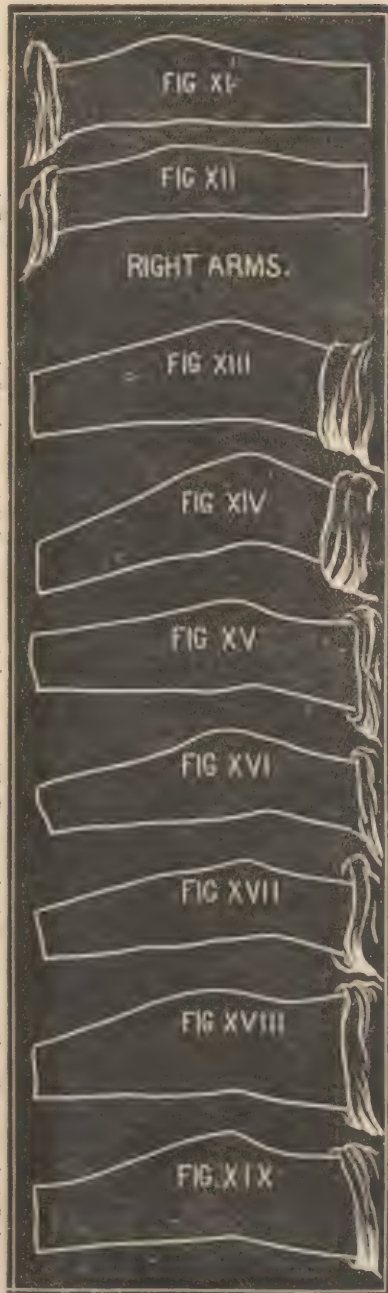
Fig. XV.—G. G., 62. Fracture Int. condyle in early childhood. Treated on wooden splints. Good motion. Carrying function impaired.

Fig. XVI.—Wm. S. Fracture of Ext. condyle. ¼ inch difference between the elevation of the condyles. Extreme flexion impaired. Good motion.

Fig. XVII.—W. P., 25. Fracture of Int. condyle, in early childhood. Condyle elevated ¾ in. Olecranon twisted toward it. Good motion.

Fig. XVIII.—Willie W., æt 10. Ext. condyle fractured. Treated at right angles with lateral sole leather splints. Ext. condyle ½ inch below its normal level. Every function good save carrying.

Fig. XIX.—Fred. H., 9. Ext. condyle ¼ inch below normal position. Good motion. Treated with lateral sole leather splints, well softened before application.

FIG XI
FIG XII
RIGHT ARMS.
FIG XIII
FIG XIV
FIG XV
FIG XVI
FIG XVII
FIG XVIII
FIG XIX

trochlear surface, and the wedge below represent the
olecranon. So long as the fracture is but partial, as at (*A*),

FIG. 14. — DIAGRAM-
MATIC REPRESENTATION
OF RELATIONS OF ULNA
TO CONDYLOID FRAG-
MENTS OF VARYING SIZE.

the point of the wedge may catch
above and pressure hold it in place.
But when the fracture is at (*B*), *i. e.*,
at the centre of the trochlear surface,
then there is no point for the wedge
to catch, and any upward pressure
from bandage or muscles will lift the
fractured condyle and render deform-
ity inevitable.

Dorsey, as long ago as the year
1813, in his "Elements of Surgery," vol. i, calls special
attention to this deformity, and takes the pains to present
to the eye a full-page figure of a normal arm and contrasts
it with one bearing this deformity.

He says that it does not matter much when the deformi
ty happens to a man if he enjoy all the motions of the joint.
I agree with him that it is a much greater deformity in wom-
en than in men, but there is a function happily styled the
"carrying function" by my friend, Dr. Fowler of Brooklyn,
that is of the greatest importance to the laboring man.   By
means of the natural angularity of the limb, he is enabled
to rest the inner condyle upon the swell of the pelvis, and
thus carry a weight with the least expenditure of muscular
force, while this "carrying function" is lost to everyone
bearing the deformity above mentioned.

I come now to the second part of my subject, viz : how
to obviate this deformity.

Upon this part I feel that I can speak with the force of
practical experience. Believing,—as I always have,—that
the deformity was produced by the splints employed, I have
never, in a single instance, employed a manufactured splint.
Believing also, that it was just as safe to dress the limb in

the extended as in the flexed position, I have, with few exceptions, adopted the former. Upon these two points hangs the success I have had in overcoming the deformity so frequently seen here ; for I say candidly—not boastfully— that I have never had what might be called a deformity from fracture in this region.

The first case that I treated, was in my clinical service at Howard Hospital. A lad was brought to me about six years of age, with fracture of the internal condyle (trochlea). The injury had just happened, and there was but slight swelling. Taking the limb, I placed it in an easy, natural, extended position, and then entrusting it to an assistant, I applied strips of adhesive plaster, about an inch wide, and long enough to extend from near the shoulder to near the wrist, so as to cover in the surface of the limb. Over this layer I applied a second layer, thus having two layers of longitudinal adhesive strips about the joint. In this condition I dismissed the lad with in-

FIG. 15.—RELATIONS OF OUTWARD ANGLE OF FOREARM WITH ARM TO THE CARRYING FUNCTION.

structions to the mother. I saw the case frequently at first, and then once a week, and, at the end of six weeks, removed the first and only dressing. If any one will reflect a moment, he will see that such a dressing was not a shiftless or reckless affair, but one that met every requirement of the case. First, in the two layers of adhesive plaster there was sufficient firmness (stickiness) to keep the whole limb in the position in which I first
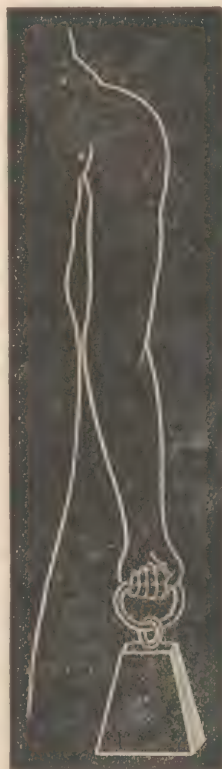
left it. Second, there being nothing about the joint but adhesive plaster, the little fellow, as soon as the pain left the arm, began by degrees to use it, and this was not wholly prevented by the adhesive plaster dressing. Thirdly, as there was nothing but adhesive plaster about it, I could handle and press the tissues about the joint, and thus by their tolerance of manipulation, form an accurate estimate of the true condition of the joint. I retained the dressing longer than was necessary, and when I removed it I found neither deformity nor limited motion—the result was, if such an expression is ever admissible, perfect.

This application of longitudinal strips of adhesive plaster is a favorite dressing of mine. If, for one moment, the mind is permitted to revert to the character of the injury (the fracture of the internal condyle for instance), it will be seen that the defect is confined to that region, and he who puts strips of adhesive plaster along the inner and outer aspects of the joint, is, as it were, adding two surface hinges to the arm, until nature shall have repaired the broken internal hinge. These lateral strips are greatly supplemented by the other strips, as one will see that it is practically impossible to use the arm much with plaster adherent to its whole surface.

In subsequent cases I used the adhesive plaster in part only. Thus, first applying the longitudinal strips, one over each condyle and one posteriorly, in other words, covering the postero-lateral aspects of the limb with adhesive strips, I have added a layer of cotton batting, and over this applied a bandage.

In still other cases I have omitted the adhesive strips entirely, and applied a firmer dressing. A favorite dressing is the egg paste.* This I usually apply at the end of a week,

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* Take the white of two or three eggs and stir into it enough flour to make a paste. This is rubbed or smeared on with the hand, and when dry, becomes a firm, hard dressing.

but have often applied it immediately after the accident. These are the details of the dressing : Placing the limb in an easy, extended position, I apply a layer of cotton batting to the joint, and for some distance above and below it ; over this I apply a bandage, and as soon as the cotton is covered in I smear the whole surface of the bandage with the paste, then add a second layer of bandage, which, in turn, is covered with the paste, and the dressing finally completed with a third layer of bandage. The perfection of the cure will depend wholly upon the natural position assumed by the limb while the dressing is applied. Hence, lay the patient on the back, and with both arms stripped take the sound arm as the guide. When the limb is placed supine, the thumb looking outward, *note that the normal limb is not straight*, but that an obtuse angle is to be observed on the radial side of the elbow joint. Observe this in the dressing, and if this is carefully preserved until the paste has hardened, there is nothing to fear from displacements. The hand can then be placed prone if more agreeable. Should there be the least doubt of the accuracy of the position after the forearm is prone, then place its fellow prone and compare them.

The reasons why I place the limb in the extended position are :

(*a*.) In this position I have an advantage of comparison during the dressing that I have in no other position. (*b*.) When only one condyle is broken, if the ulnar side of the joint is the only one that is injured, I have, in the extended position, the whole length of the radius to act as a splint or a controlling lever.

In this position the head of the radius abuts against the sound outer condyle, and by its prodigious leverage with the ulna can keep the internal condyle from ascending ; while the surrounding paste dressing, having hardened,

will favor the retention of the ulna, will prevent its wedging off the condyle, and thus retain the fragments until union no longer requires the dressing.

I sometimes dress the limb at a right angle, but rarely, except when in consultation. When this is proposed, I dress the limb with cotton and the bandage for a week in the extended position, and then, bending it to a right angle, I apply about the joints, first the cotton, then the bandage and paste, as already fully described. This dressing is essentially different from the angular splints, as will be readily seen. First, I apply it after the limb has been dressed in the extended position a week; second, the dressing is applied in a plastic condition, and accommodates itself to the limb. There are no fixed points like the arms of a wooden arbitrary splint to which the bandage can force the broken condyle, and hence the dressing, when first applied, can hardly be called a splint, and only becomes one a few hours later when it has hardened. If, while it was hardening, the limb was in a natural position, then the hardened dressing becomes a perfect outside case, and the cure will be a good one. Should any one desire to remove such a splint as this it can be cut the entire length of the limb and readily sprung off with cotton *in situ*, and reapplied without any possible mischief, while the fixed angular splints, applied as they are with a fresh bandage after each removal, are calculated to do additional harm at each dressing.

I have thus far confined myself to the *deformity*—how it is produced and how it may be avoided. I will now add briefly a few general remarks upon the medical aspects of the case.

The prevalent opinion in regard to this joint is that it is especially prone to stiffness, anchylosis and deformity. I have fully discussed the latter point, and will now take up that of stiffness and anchylosis. This sequel to these in-

juries is so much dreaded that authors and surgeons are most earnest in pointing out the necessity of early and, if necessary, persistent passive motion. Some recommend that this feature be instituted even during the first week, others in the second, but all agree that it is never to be lost sight of.

Upon this subject I desire only to state my own practice, not to recommend it. My prognosis in all these injuries varies with their degree and character. If a child falls from a chair, from a fence, or from a tree, the same fracture may be produced in each case, but the amount of injury to the soft parts may vary greatly. In the first case it may be very slight. In the third it may rise to its maximum.

By this illustration I wish simply to remark that, as there are distinct and well-founded grades of injury, so there may and should be a course of treatment suited to each grade, and that it is a great mistake to prescribe a uniform line of treatment for all these injuries.

Again, whatever the nature or character of any individual fracture, its treatment may be divided into three stages: (*a*) the treatment of the initial lesion, (*b*) its treatment during repair, (*c*) the means necessary for reclaiming the function.

The FIRST or milder grade of fractures about the elbow-joint requires attention only to the initial lesion. If well "set," if properly dressed, they will usually give no trouble during the entire period of repair, and when the period of usefulness arrives, viz., the period of functional activity, no passive motion will be required, since Nature stands ready to resume the function which she herself suspended.

The SECOND or middle grade of injuries requires slightly different treatment under each head. The initial lesion may require a first dressing of cotton, or anodyne lotions,

and the permanent dressing may be a little delayed.   In the
second stage, it may be well to remove the dressings to
favor the decline of inflammation that may still persist, to
bathe the limb or apply liniments to allay soreness.   This
stage (the stage of repair) may be one of some discomfort
to the patient, but it need not be one of solicitude to the
medical attendant.   If the limb has been kept quiet * dur-
ing the first and second stages, there need be no distrust
about return of function.   This will not be so early and
rapid as in the first grade, but this cannot fairly be ex-
pected of it.   It was a severer injury in the outset, and
hence its restoration will be more delayed.   In this class, as
in the first, I do not resort to passive motion during the
second stage.   I give the bone time to heal, and the soft
parts to get well, before I begin motion ; and when employ-
ing motion, if I find that beyond a certain degree of flexion
and extension, pain is produced, I assure my patient that
he is to employ his limb gently and mildly, and that the
full function will return as soon as soreness has disap-
peared.

I come now to the THIRD grade of injuries.   This class es-
pecially demands the most judicious surgical skill during all
the three stages, viz.: during the initial lesion, during re-
pair, and in its full restoration to usefulness.   In this class
the injury is of the severest character, and the few mo-
ments that I have left me are wholly inadequate to
treat the subject.   I pass by the first stage—a most crit-
ical one to the patient—and attack only the single query,
"shall passive motion be instituted during the second
stage?"   My own practice is to *maintain absolute rest.*
I do not hope for early functional return in this class.   I
am willing to prescribe four or six months to such cases.

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* By this I do not mean that the arm should not be removed from its
dressings, daily if necessary.   By *quiet* I mean *no passive motion* during the
first and second stages of injury.

But the question arises, will early passive motion hasten matters any? My reply is, I believe that it cannot hasten, but may greatly retard the cure. In this class I give the parts rest, hoping with the judicious use of liniments, the douche, shampooing and the like, to lessen pain and restore a healthy action, but defer the third stage of treatment to its proper place. In the fifth or sixth week, gentle motion may be applied. In cases such as these, when the swelling and inflammation have measurably subsided, it may expedite matters to give an anæsthetic and gently flex and extend the forearm. Two or three slow motions under ether, and repeated after a week,—the arm being kept quiet in the interim,—may be of great advantage here. But this need not be done earlier than the seventh or eighth week. I am aware that many of the books and many surgeons will say that such stiffness *could have been avoided* by early passive motion, but I simply state that I hold a contrary opinion.

When others claim that they begin passive motion in the second week and never have anchylosis, I wish my experience to be put along side of theirs, and I repeat that I never use passive motion under any circumstances earlier than the fourth week, and in the milder and middle grades have never any trouble with functional return—while in the severest grades of injury there is great injustice done the medical profession as well as to the patients by intimating that any course whatever would have insured a prompt return to usefulness.

But while some claim that by early passive motion they never have anchylosis, they omit to mention the three or four weeks of torture through which they often lead their patients by such a course. No surgeon of experience has failed to note the gradually increasing soreness that has followed this untimely interference, and many is the doctor

that has been forced to desist from such a course, and many is the mother that has taken her child to the rack until maternal instincts have yielded to the importunities of the little sufferer, and, preferring a stiff arm, she has abandoned treatment. Thus dooming the child to inevitable anchylosis? By no means. The little one kept his arm quiet until pain disappeared, and then began to use it.

I have thus, gentlemen, laid before you my own views and practice. There has been no time for argument. Hence, all I desire is that, in consequence of the frequency of these injuries, and the prevalence of the deformity, you would examine anew the subject.

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